

SEMESTER END EXAMINATION, DECEMBER 2025

Course Name: - B. Tech

Semester: - 3

Paper Name: - SOFT COMPUTING

Paper Code: - NCS-301

Time - 3Hrs + 20 minutes per hour extra time for V.I. & examinees with writer Max Marks-70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **03** marks. All questions are compulsory.
- Section B- Answer any **5 out of 7** given questions. Each question carries **7 marks**.
- Section C- Answer any **2 out of 3** given questions. Each question carries **10 marks**.

Section – A

Objective Questions

1. Answer all the following questions.

5×3=15

i. Learning rate affects:

- | | |
|-----------------|-------------------|
| a) Network size | b) Training speed |
| c) Input values | d) Output layer |

ii. Overfitting occurs when:

- | | |
|------------------------------|------------------------------------|
| a) Network learns too little | b) Network memorizes training data |
| c) Learning rate is small | d) Training data is less |

iii. Genetic Algorithm works on a population of:

- | | |
|--------------|----------------|
| a) Rules | b) Chromosomes |
| c) Functions | d) Neurons |

iv. Which learning uses reward and penalty?

- | | |
|------------------|-------------------|
| a) Supervised | b) Unsupervised |
| c) Reinforcement | d) Batch learning |

v. IF-THEN rules are used in:

- | | |
|--------------------|-----------------------|
| a) Neural Networks | b) Genetic Algorithms |
| c) Fuzzy Logic | d) Boolean Logic |

Section – B

Short Answer Questions

2. Answer any five of the following questions.

5×7=35

- i. Explain the biological neuron and compare it with the artificial neuron model using a neat diagram.
- ii. Explain different activation functions used in neural networks with graphs and applications.
- iii. Describe various learning techniques used in neural networks.
- iv. Explain the architecture of backpropagation neural network with diagram.
- v. Define fuzzy logic and explain its need over classical logic.
- vi. Describe the difference between crisp sets and fuzzy sets.
- vii. Explain single-layer and multi-layer perceptron models with their limitations.

Section – C

Descriptive Questions

3. Answer any 02 question of the following question.

2×10=20

- i. Explain the working principle of Genetic Algorithm (GA). Describe its components and genetic operators with a flow chart.
- ii. Describe a fuzzy controller and explain the working of a fuzzy controller with an example.
- iii. Describe defuzzification. Why is defuzzification required? Explain common defuzzification methods.